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NEW SPECIES OF NEARCTIC SNOW CRANE FLIES OF THE GENUS *CHIONEA* (DIPTERA: TIPULIDAE)

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Abstract.—*Chionea jenniferae,* n. sp., from southern California, and *C. reclusa,* n. sp., from southern Illinois, are described and illustrated. A note on variation in *C. scita* Walker is appended, and new occurrences of *C. scita* and *C. valga* are recorded.

Key Words: *Chionea,* Tipulidae, Limoniinae, distribution, variation, winter insects

When the North American species of *Chionea* were dealt with in some detail more than a decade ago (Byers 1983), I would not have predicted the discovery of any additional nearctic species, except perhaps in remote boreal forests of Canada. But late in 1993 two remarkable new species were collected, one far south of the previously known range of the genus in California and the other near the southernmost range in Illinois. I am indebted to Saul I. Frommer of the University of California, Riverside, and Michael A. Goodrich of Eastern Illinois University, Charleston, for forwarding these interesting insects to me.

Discovery of these two species brings to 18 the number of species of *Chionea* known from North America.

Chionea jenniferae, NEW SPECIES

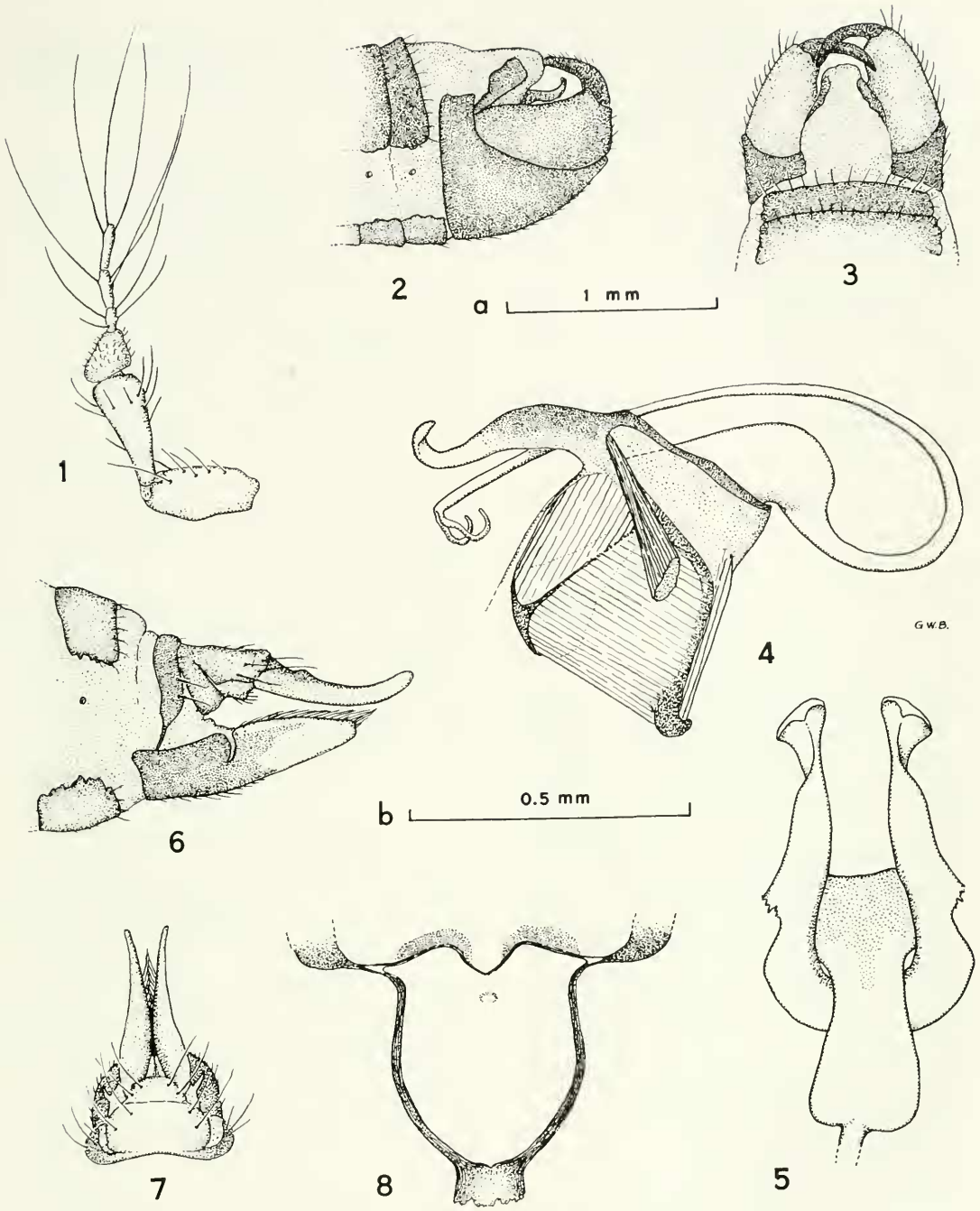
Description based on 7 males and 15 females, preserved in alcohol.

Diagnosis: A dark brown, southwestern species with 2 or 3 flagellomeres beyond fusion segment; sclerotized parts of ninth abdominal tergum of male widely separated medially by membrane, gonapophyses with pale, upturned apices; eighth abdominal tergum of female abruptly narrowed at sides, ninth sternum not divided medially.

Head: Dark brown. Antennae (Fig. 1) comprising subcylindrical scape, long-turbinate or subconical pedicel about as long as scape, fusion segment and three, less often two, additional flagellomeres, if three the basal one shorter than others. Major setae on vertex about as long as diameter of eye, black, about six in number, directed forward. Compound eyes of 80–90 ommatidia, nearly same number and size in both male and female.

Thorax: Sclerotized surfaces brown to dark brown, almost black in some males; membranous areas paler. Halteres light brownish gray. Sparse (6–8) dark setae on mesonotum, shorter setae on pronotum. Coxae and trochanters brown to dark brown, darker than yellowish brown to brown femora and tibiae. Tarsi approximately same color as tibiae except fifth tarsomere darker. Femoral setae nearly as long as diameter of femur at level of attachment, in four dorsal rows and three often indistinct ventral rows; ventral setae on femora of robust males not in rows. Tibial setae longer than diameter of tibia.

Abdomen of male: Terga 1–8 unevenly brown to dark grayish brown; posterior margin of each bearing 16–18 dark setae, 3–4 additional setae at each side and a few



Figs. 1–8. *Chionea jenniferae,* n. sp. 1, left antenna, holotype, left lateral aspect. 2, terminal abdominal segments, male holotype, left lateral aspect (most setae omitted). 3, same, dorsal aspect. 4, gonapophysis, penis or aedeagus, associated apodemes and muscles, male paratype, right lateral aspect. 5, gonapophyses and basal enlargement of penis, dorsal aspect. 6, terminal abdominal segments, female allotype, left lateral aspect. 7, same, dorsal aspect. 8, ninth sternum and genital furca, female paratype, posteroventral aspect. Scale a, Figs. 1, 4–5, 8; scale b, Figs. 2–3, 6–7.

scattered, short ones. Corresponding sterna slightly paler. Pleura unevenly light grayish brown. Ninth tergum and sternum (Figs. 2, 3) dark brown, tergum broadly divided dorsomedially, membranous surfaces pale gray-brown, those of ninth and tenth terga continuous. Lateral sclerites of tenth segment (tergal derivatives?) dark brown. Basistyles lighter brown than ninth sternum; dististyles dark brown, mostly glabrous, widened at base but without distinct basal teeth. Gonapophyses (Figs. 4, 5) dark yellowish brown to brown except apical one-third yellowish, each slightly twisted subapically, apex widened and curved upward. Penis (Fig. 4) unusually elongate, conspicuously expanded and only moderately sclerotized at base; basal expansion projecting upward between bases of gonapophyses, then abruptly curved cephalad; slender portion recurved, with two curled apical filaments directed laterad.

Abdomen of female: Tergum 1 uniformly dark yellowish brown. Terga 2–7 mostly yellowish brown, darker along anterior edge and very narrowly along posterior edge, at sides and diffusely along mid-line; posterior margin with about 10 black setae, scattered shorter setae elsewhere. Sterna more evenly yellowish brown, with about 20 dark brown to black setae along posterior margin, a few others scattered over surface. Pleural areas unevenly light brown. Tergum 8 abruptly narrowed at each side (Fig. 6); terga 9–10 short, wide (Fig. 7); cerci mostly light yellowish brown, darker along dorsal edge, slightly upcurved, with bluntly rounded apex (Fig. 6). Hypovalves light yellowish brown clouded with brown; eighth sternum brown. Genital furca (Fig. 8) lyre-shaped, with slender arms bowed outward. Ninth sternum formed of convergent slender prolongations from lower corners of tergum 9, with area of light sclerotization adjoining each; median portion deflected somewhat ventrad.

Body length (excluding antennae): Male, 3.51–4.34 mm. (holotype 3.59 mm.); female, 3.90–6.48 mm. (allotype 6.34 mm.). Hind femur of holotype 2.39 mm. long, that of allotype also 2.39 mm. Specimens are variously contracted or extended in fluid preservative.

Types: Male holotype, female allotype, 6 male and 14 female paratypes, collected from surface of snow in San Gorgonio Wilderness, near Fish Creek Camp (4.3 km. northeast of Mt. Gorgonio, at elevation approximately 2620 m.), in the San Bernardino National Forest, about 46 km. (29 mi.) east of San Bernardino, San Bernardino Co., California, on 13 November 1993, by Gregory P. Walker. Holotype, allotype, 2 male and 2 female paratypes in Snow Entomological Museum, University of Kansas, Lawrence; 4 male and 12 female paratypes in collection of University of California at Riverside.

In a letter, Dr. Walker describes the type locality as ". . . in a coniferous forest dominated by Jeffrey pine (*Pinus jeffreyi*) and white fir (*Abies concolor*). There is not much of an understory; it is pretty open with scattered shrubs and lots of bare soil. The terrain . . . was fairly steep and the ground was completely covered in snow."

At the request of the collector, Dr. G. P. Walker, this species is named for his six-year-old daughter, Jennifer, who first noticed the Chioneas, called them to her father's attention and helped collect them.

Chionea jenniferae most closely resembles *C. carolus* Byers of the northern and central Sierra Nevada (Byers 1983: 169–172, figs. 163–170) and is somewhat less similar to *C. lyrata* Byers (1983) of the northern Sierras. Characteristics shared by *jenniferae* and *carolus* include small size, dark color, short antennal flagellum and, in males, the twisted, upturned apices of the gonapophyses and the shape of the dististyles. Females of these species are similar in the shapes of abdominal terga 8–10 and of the genital furca. Differences include, most significantly, the complete dorsomedial inter-

ruption or separation of the ninth abdominal tergum in the male of *jenniferae*, a character unique among all known species of *Chionea*. In *carolus*, the ninth tergum is deeply emarginate medially, more so than in any other species, yet is clearly continuous. While unlike that of any other nearctic species, the penis or aedeagus of the male in *jenniferae* has a form decidedly like that in *C. lutescens* Lundstrom and some other western palearctic species that have been differentiated from *Chionea* and assigned to a genus *Niphadobata* (cf. Burghele-Bălăcesco, 1969: plates 2, 5). This may have a causal relationship to the membranous division of the ninth tergum, for (in preserved specimens) the penis arches dorsad and is deeply impressed against the underside of both the ninth and tenth terga. The structure of the genital fork and ninth sternum in the female shows no apparent adaptation to either the aedeagal curvature and length or the apical filaments* (i.e. no conspicuous differences from corresponding parts in females of other species). The male keys to *C. jellisoni* at couplet 10 in my earlier key (Byers 1983: 123); the female goes to couplet 16 but not to either species identified there (p. 126).

Chionea reclusa, New Species

Description based on one male specimen preserved in alcohol.

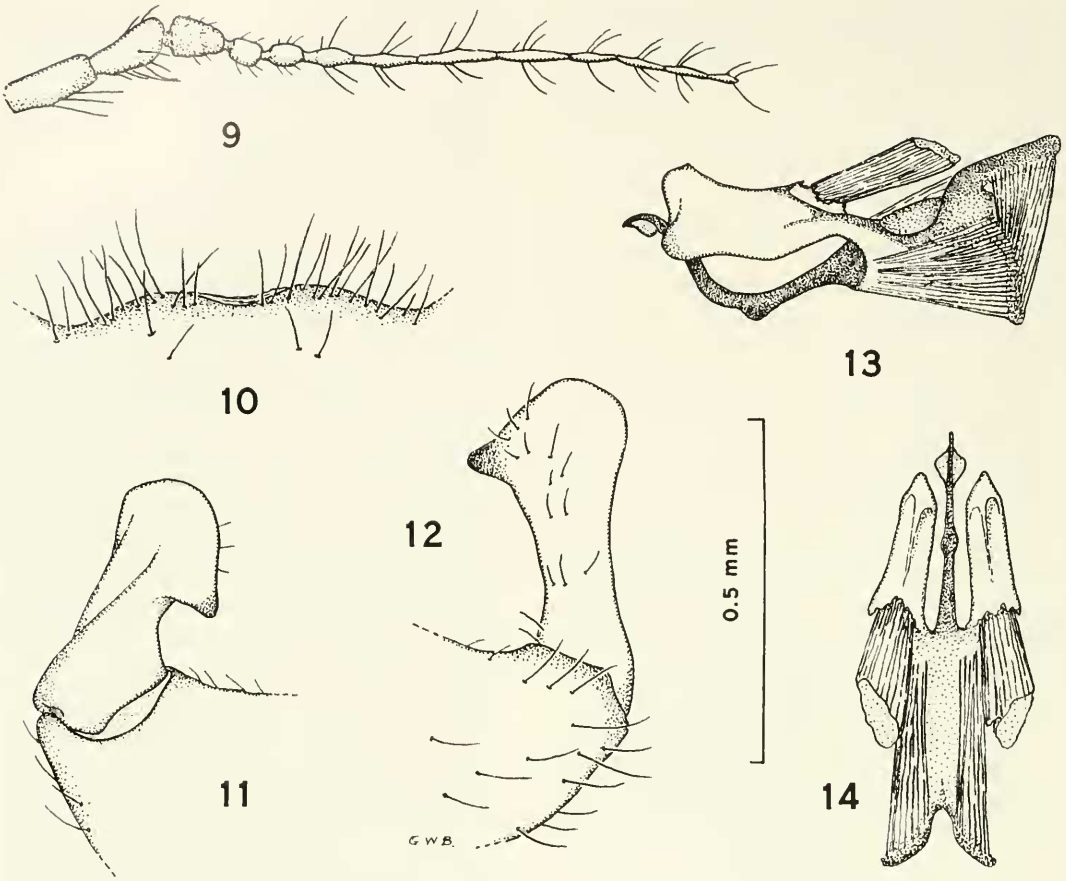
Diagnosis: A light yellowish brown species with 13-segmented antennae; male dististyles enlarged apically but without blackened points near base, ninth abdominal tergum shallowly emarginate medially, apex of each gonapophysis pointed in dorsal aspect but truncated in lateral aspect.

Head: Dark yellowish brown. Antennae (Fig. 9) with subcylindrical scape, pedicel about as long as scape, fusion segment and ten additional flagellomeres. About 16 dark setae scattered over vertex, directed generally forward. Compound eyes of approximately 110 ommatidia each. Antennae and maxillary palps pale grayish brown; cervical sclerites grayish brown.

Thorax: Most sclerotized surfaces yellowish brown; sternum, coxae and trochanters slightly paler yellowish brown; membranous areas and halteres pale buff-gray. About 12 prominent setae on mesonotum; shorter setae on pronotum. Wings minute, smaller than in other species of similar body size. Femora, tibiae and most of basitarsi yellowish brown; apical one-fourth of each basitarsus and all of other tarsomeres grayish brown. Most setae on hind coxa in outer vertical row; others on ventro-mesal surface. Hind femora only slightly thickened (as other femora), each with four dorsal rows of setae and three ventral rows. (Right middle leg missing from holotype.)

Abdomen of male: Terga 1–8 mostly yellowish brown, 2–7 grayish brown at each side and narrowly along anterior margin; tergum 1 darker at sides only; about 14 dark setae along posterior edge of each tergum, other setae at sides; no conspicuous setae on tergum 8. Sterna 2–7 light yellowish brown bordered on sides by light brown; 14–18 dark setae long posterior edge, a few others at each side and elsewhere on posterior half of each sternum. Pleural areas pale buff. Genital bulb pale yellowish brown with dark brown setae. Ninth tergum (Fig. 10) broadly rounded, only slightly emarginate medially, with 12–14 marginal setae at each side. Dististyles (Figs. 11, 12) without basal teeth, expanded and rounded apically, with blunt, darkly sclerotized, subapical point directed inward and somewhat forward. Gonapophyses (Figs. 13, 14) pale yellowish brown with brown lateral markings, with truncate dorsal apex and rounded, more ventrolateral apex. Penis slightly expanded near mid-length, bearing thin, rounded, yellowish flange at each side shortly before apex.

* In an earlier paper on *Chionea* (Byers 1983: 78), I stated incorrectly that apical filaments occur in *C. valga* and *C. obtusa*; these are present in *C. valga* and in *C. hybrida*.



Figs. 9–14. *Chionea reclusa,* n. sp., male holotype. 9, left antenna, left ventrolateral aspect. 10, ninth abdominal tergum (medial portion), dorsal aspect. 11, left dististyle and apex of basistyle, mesal aspect. 12, same, left lateral aspect. 13, gonapophysis and penis or aedeagus, associated apodemes and muscles, right lateral aspect. 14, same, dorsal aspect. Scale, all figures.

Body length (excluding antennae): Male holotype, 4.90 mm.; length of hind femur, 3.01 mm.

Type: Male holotype, collected in Malaise trap operated from 15 November to 30 December 1993, 11.2 km. (7 miles) west of Carbondale, Jackson Co., Illinois, by M. A. Goodrich and D. L. Wood. The holotype is in the Snow Entomological Museum, University of Kansas, Lawrence.

This site is in the edge of the Shawnee National Forest. Dr. Goodrich has described the habitat as "a mature second-growth deciduous forest . . . (with) numerous standing dead trees and downed logs in the vicinity." The location is T9S, R2W, Sec. 20, NW ¼.

Chionea reclusa is so named because of its isolation from what appears to be its only close relative, *C. wilsoni* Byers of northeastern Alabama (Latin *reclusa* = separated, removed). Although the true extent of the ranges of both these species is as yet unknown, the collections that provide our only hints are separated by nearly 560 km. (350 miles).

Chionea reclusa, as understood from the male only, belongs to the *scita* group of species (Byers 1983: 126) on the basis of its coloration, its elongate antennae, and its vertically oriented gonapophyses without upturned apical hook. It shares with *C. wilsoni* 13-segmented antennae and the unusually shaped dististyles, which instead of tapering to an acute apex as in all other species are apically expanded, rounded and mesally concave. *C. reclusa* differs from *wilsoni* in the shapes of the gonapophyses, penis, ninth abdominal tergum, and in several details of the dististyles (cf. Byers 1983: 193, figs. 219–226). The male keys to *C. wilsoni* at couplet 3 in the existing key (Byers 1983: 122).

Chionea scita Walker

Dr. Richard L. Hoffman, of the Virginia Museum of Natural History, Martinsville, sent for my examination a collection of six males and seven females of this species, which he caught in a pitfall trap set in a forest of mixed hardwoods, 25 October to 23 November 1991. The site is at an elevation of 1190 m. on a peak of the Blue Ridge called "The Priest," in the George Washington National Forest, 7.2 km. southeast of Montebello, in Nelson Co., Virginia.

This collection, while not large, shows considerable variation in dimensions of individuals, such as has been noted in other species (e.g. Byers, 1983: 73, 148). The largest male, for example, is nearly twice the size of the smallest in overall length (ratio of 1.98 to 1). Earlier, I have used the hind femur as an indicator of the disproportionate development of "robust" males of *Chionea* as compared to small, slender-legged males. In this case, while the ratio of length of hind femur is only 1.78 to 1, greatest femoral width shows a ratio of 2.75 to 1. The females also show great size difference, largest to smallest being in a ratio of 1.74 to 1 for overall length, but there is less variation in dimensions of the ovipositor (ratios of length of ovipositor, hypovalves, etc., being 1.38–1.40 to 1).

Measurement of those parts of the male external genitalia likely to be in direct contact with the female ovipositor reveals much less variation than in body length, etc. Length of dististyle, for example, varies in this sample (largest male: smallest male) in a ratio of 1.25 to 1, and length of anterior edge of basistyle (taken as a measure of inner curvature, which is difficult to obtain without dissection) shows a ratio of only 1.05 to 1. The point of all this is that in their apparently haphazard search for mates on the snow surface (or in leaf litter, etc.), males need not go from one female to another until they reach one of corresponding overall size.

This is only the second reported occurrence of *Chionea scita* in Virginia, the other being far to the southwest in Smythe County. The species, however, ranges fairly widely, from Vermont westward to Michigan and southward to northern Georgia (but probably only in the Appalachian Mountains, south of Pennsylvania).

Two female specimens of this species were recently received from Dr. Peter Adler of Clemson University. These were collected in a Malaise trap set by a spring brook at Tanglewood Spring, near Pendleton, elevation 226 m, Anderson Co., South Carolina, 1 December 1987– 3 January 1988, by John Morse. They constitute the first record of the occurrence of the genus *Chionea* in South Carolina.

Chionea valga Harris

A male of *C. valga* was recently received for examination from Dr. Charles Parker, research biologist in the Great Smoky Mountains National Park. It was found in a drift net (24-hour sample) set in Noland Creek, Swain Co., North Carolina, elevation 1727 m, 17 February 1993, by G. Salansky. This discovery extends the species' range about 240 km (140 miles) south west-

ward from its previously known range (Virginia and northward) and is the first recorded occurrence of *C. valga* in North Carolina.

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